

Landsat Data Continuity Mission Data Specification

Introduction

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Following both public law and a Presidential Decision Directive, NASA and the USGS are working in partnership toward a recommendation for extending continuity of the long-term records of space-based medium resolution (i.e., ~30 meter) land observations beyond Landsat 7. In 1992, Congress established four options for what is now being called a Landsat Data Continuity Mission (LDCM):

1. Private sector funding and management of a successor land remote sensing system
2. Establishing an international consortium for the funding and management of a successor system
3. Funding and management of a successor sensing system by the United States Government
4. A cooperative effort between the United States Government and the private sector for the funding and management of a successor system

Congress also indicated that the first option is preferred as long as it also achieves the overall goals of the Landsat Program.

A joint NASA/USGS ad-hoc science team recently developed a draft LDCM Data Specification, with the idea that, regardless of which funding/management option is finally chosen, the Landsat data user community should first establish a baseline data requirement.

The following specification was written to describe the data and unenhanced data products meeting the scientific and application objectives identified based on the use of Landsat data during the past three decades

In the past, mission specifications were typically written for the spacecraft, sensors, and ground systems that would need to be designed and developed to meet science and applications requirements. This former approach not only defined what data were needed but also provided direction on how to acquire the data from specified spacecraft, sensor, and ground systems. This new “data spec” approach focuses primarily on the data and data products required from a Landsat data continuity mission. This approach allows bidders responding to a Request for Proposals (RFP) for LDCM data to apply innovation and creativity when defining a satellite system capable of providing the required data at the lowest cost to the government.

The draft specifications are driven by several considerations in addition to the goals and objectives set forth in the 1992 Land Remote Sensing Policy Act: a historical perspective of the Landsat Program; the perspective of the growing constellation of

remote sensing satellites among which the LDCM will orbit; the ongoing performance of the Landsat 7 satellite system; and the overall state of Earth remote sensing technology. The technical specifications are based on the Landsat 7 Enhanced Thematic Mapper Plus (ETM+) specifications; the actual quality and quantity of ETM+ data acquired from Landsat 7; and the capabilities of mature technologies which will be ready for infusion into the next Landsat system.

The draft describes and defines the data products that NASA and the USGS should obtain to support the Landsat user community. These products are limited by the 1992 Land Remote Sensing Policy Act to “unenhanced” data processing, where the term is defined as "...registration of such data with respect to features of the Earth; and calibration of spectral response." Consequently, the data products defined in the draft specification are limited to those resulting from systematic radiometric, atmospheric, and geometric/geographic corrections.

The data specification approach further assumes that the raw data acquired by in-orbit satellite(s) would be sufficient to generate the specified LDCM data products with the exception of precision-corrected, terrain-corrected, and higher level products, which would require ancillary ground control points, digital elevation models, etc. The RFP for LDCM data may request proposers to provide raw data and/or unenhanced data products. The RFP may also require the vendor to make available to the government all the algorithms needed to produce the entire suite of unenhanced data products.

The appropriate strategy for data acquisition and distribution and the appropriate pricing policy will be the subject of further discussions and consultations between NASA, USGS, and the Landsat community. The draft specification represents an initial step in defining a Landsat Data Continuity Mission. Members of the Landsat data users community are invited to comment on the draft LDCM Data Specification in public forums and on-line (see <http://www.ldcm.usgs.gov>). Once the end products are defined and specified, NASA and the USGS can then use this information to develop the acquisition and distribution strategies and the pricing policy for LDCM data and data products.